

WHAT IS CLAIMED IS:

1. A variable valve timing controller for an internal combustion engine, the variable valve timing controller being disposed in a system in which the torque of a driving shaft is transmitted to a driven shaft adjusting an opening and closing timing of an intake valve and/or an exhaust valves, comprising:

a rotary shaft connected with a driving shaft;

a stator applying a torque to the rotary shaft by generating a magnetic field around the rotary shaft, the stator fixed relatively to the internal combustion engine; and

a rotational phase converter converting the rotational phase of the driven shaft relatively to the driving shaft; wherein

when the stator stops forming the electro magnetic field, the load torque arises on rotary shaft, and

the rotational phase converter converts the rotational phase of the driven shaft toward a feasible phase in a safety direction with receiving the load torque, the feasible phase in which the internal combustion engine can be started.

2. The variable valve timing controller for an internal combustion engine according to claim 1, further comprising:

a bearing supporting the driven shaft rotatively.

3. The variable valve timing controller for an internal combustion engine according to claim 1, wherein

the driving shaft has a magnet on the outer surface thereof, and the stator has a coil which forms the magnetic field around

the driving shaft with being fed the current.

4. The variable valve timing controller for an internal combustion engine according to the claim 3, further comprising:

a driving circuit which is connected with a terminal of the coil and feeds a current to the coil, the driving circuit making an electrical short among the terminals when the coil stops generating the magnetic field.

5. The variable valve timing controller for an internal combustion engine according to claim 1, further comprising:

a control circuit; and

a driving circuit which is electrically connected with the stator and the control circuit and feeds the current to the stator according to a signal received from the control circuit, wherein

the driving circuit applies a control torque to the rotational shaft by self-controlling the feeding of current when the control signal from the control circuit is not input to the driving circuit, and

the rotational phase converter varies the rotational phase of the driven shaft into a safety phase with receiving the control torque from the rotational shaft.

6. A variable valve timing controller for an internal combustion engine, the variable valve timing controller being disposed in a system in which the torque of a driving shaft is transmitted to a driven shaft adjusting an opening and closing timing of an intake

valve and/or an exhaust valves, comprising:

a rotary shaft connected with a driving shaft;

a stator applying a torque to the rotary shaft by generating a magnetic field around the rotary shaft, the stator fixed relatively to the internal combustion engine; and

a rotational phase converter converting the rotational phase of the driven shaft relatively to the driving shaft;

a control circuit;

a driving circuit which is electrically connected with the stator and the control circuit and feeds the current to the stator according to a signal received from the control circuit, wherein

the driving circuit applies a control torque to the rotational shaft by self-controlling the feeding of current when the control signal from the control circuit is not input to the driving circuit, and

the rotational phase converter varies the rotational phase of the driven shaft into a feasible phase in a safety direction with receiving the control torque from the rotational shaft.

7. The variable valve timing controller for an internal combustion engine according to one of claim 1, wherein

the safety direction is a delay direction.

8. The variable valve timing controller for an internal combustion engine according to one of claim 1, wherein

the safety direction is an advance direction.

9. The variable valve timing controller for an internal combustion

engine according to one of claim 1, wherein

the rotational phase converter has a driving rotational member rotating with the driving shaft, a driven member rotating with the driven shaft and a transmitting rotational member, the rotational phase converter varying the rotational phase by converting the relative rotational movement of the transmitting rotational member against the driving rotational member into the relative rotational movement of the driven member against the driving rotational member

10. The variable valve timing controller according to claim 9, wherein

the rotational phase converter has a biasing member for biasing the driven member, and a biasing direction is the relative rotating direction of the driven member in the safety direction.

11. The variable valve timing controller according to claim 9, wherein

the rotational phase converter has a biasing member for biasing the driven member, and a biasing direction is reverse to the relative rotating direction of the driven member in the safety direction.

12. The variable valve timing controller according to claim 11, wherein

the rotational phase converter has an interrupt means for interrupt the operation of the biasing force to the driven member when the rotational phase changes into the safety direction.